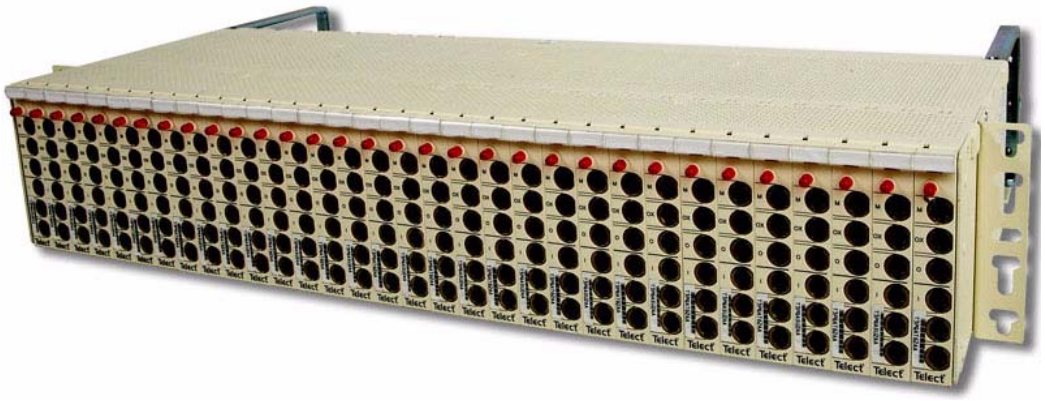
BCS 4R DSX-3 Connectivity System

Models 010-8332-0410, 010-8332-0401, 010-8324-0410 and 010-8324-0401

User Manual



Telect®
CONNECTING THE FUTURE®

BCS 4R DSX-3 Connectivity System

Models 010-8332-0410, 010-8332-0401, 010-8324-0410 and 010-8324-0401

User Manual, Part number 139256

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About Telect

Telect offers complete solutions for physical layer connectivity, power, equipment housing and other network infrastructure equipment. From outside plant and central office to inside the home, Telect draws on more than 25 years of experience to deliver leading edge product and service solutions. Telect is committed to providing superior customer service and is capable of meeting the dynamic demands of customer and industry requirements. This commitment to customer and industry excellence has positioned Telect as a leading connectivity and power solution provider for the global communications industry.

Technical Support

E-mail: getinfo@telect.com

Phone: 888-821-4856 or 509-921-6161

BCS 4R DSX-3 Connectivity System

User Manual

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Chapter 1: BCS 4R DSX-3

1.1 Introduction to Telect's BCS 4R

Telect's BCS 4R is a low-cost, high-density, space-saving total solution to DSX-3 network element connectivity.

Telect's 2 RU BCS 4R chassis accommodates up to 32 of Telect's highly reliable, 6-port BCS 4R DSX-3 modules. Each low-cost DSX-3 module features BNC and Mini-WECO connectors for cross-connecting, patching, testing. and bi-directional monitoring of network element circuits.

Panels are available fully configured and loaded with DSX-3 modules, helping to simplify purchasing and installation. Options include 24-termination/19" and 32-termination/23" panels, with 6-port DSX-3 modules. All panels are just 4" in height.

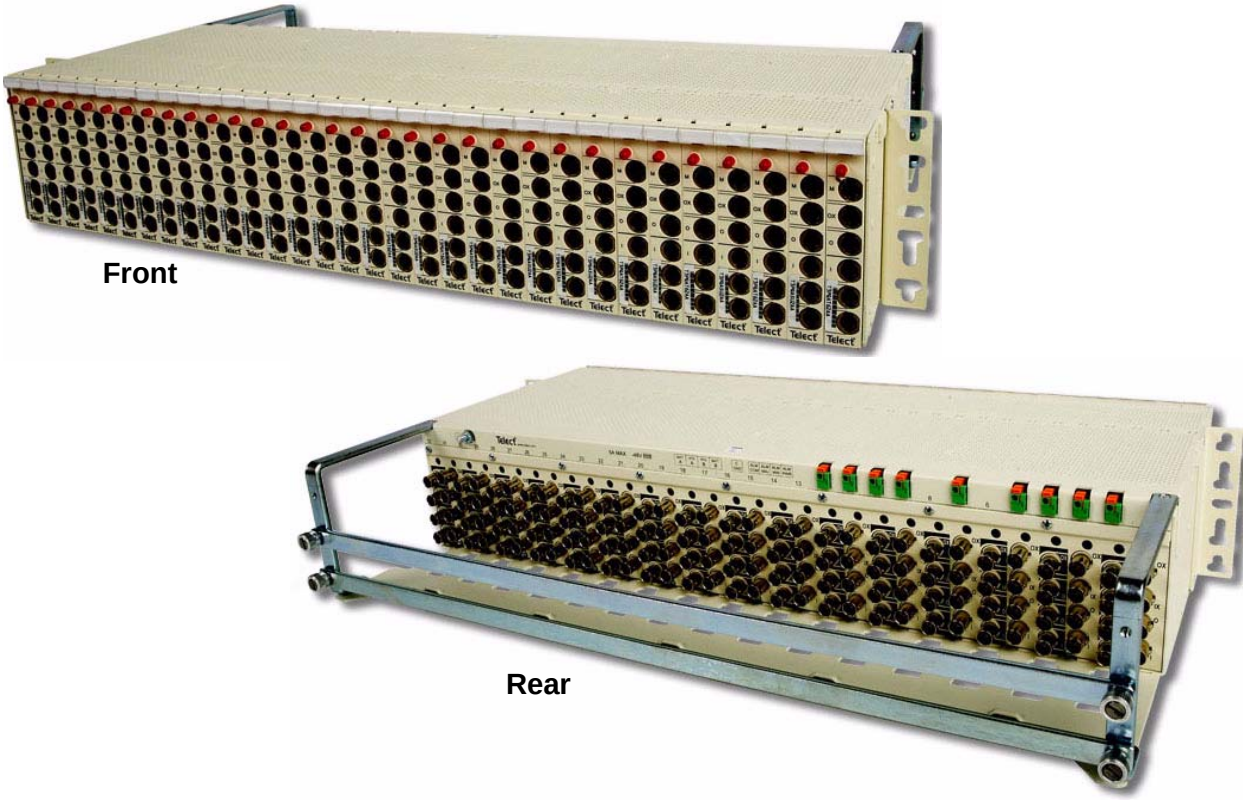

Figure 1 - Basic Chassis

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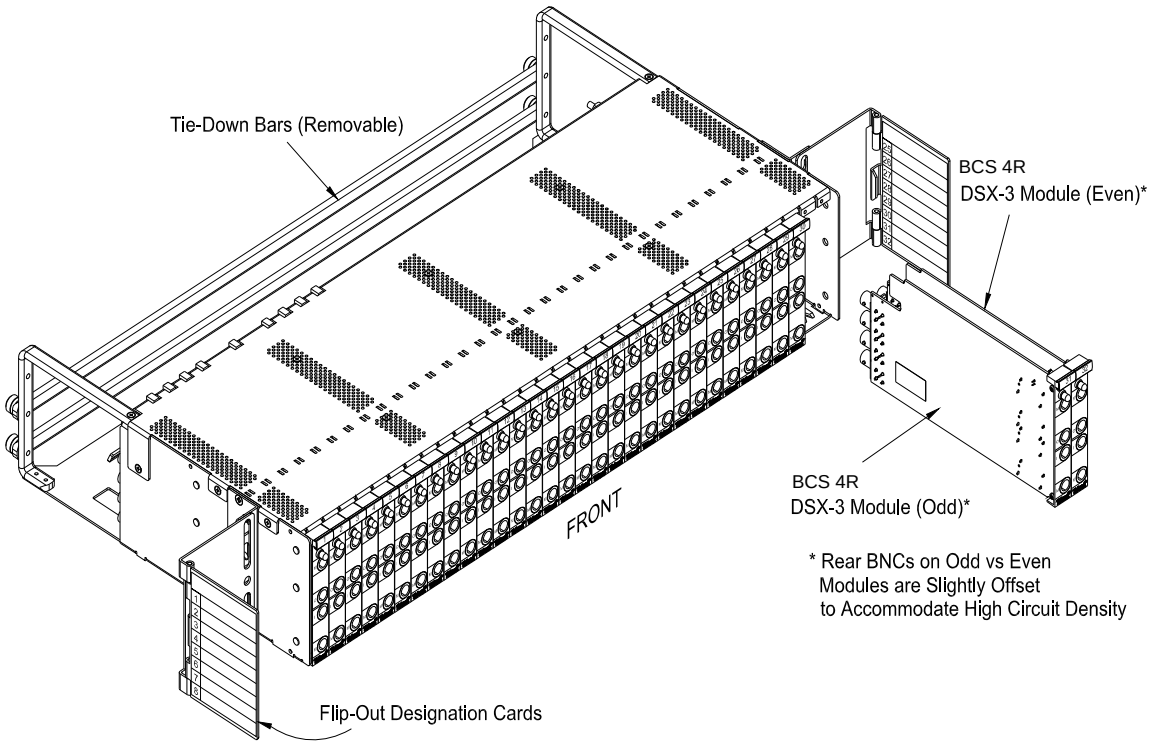

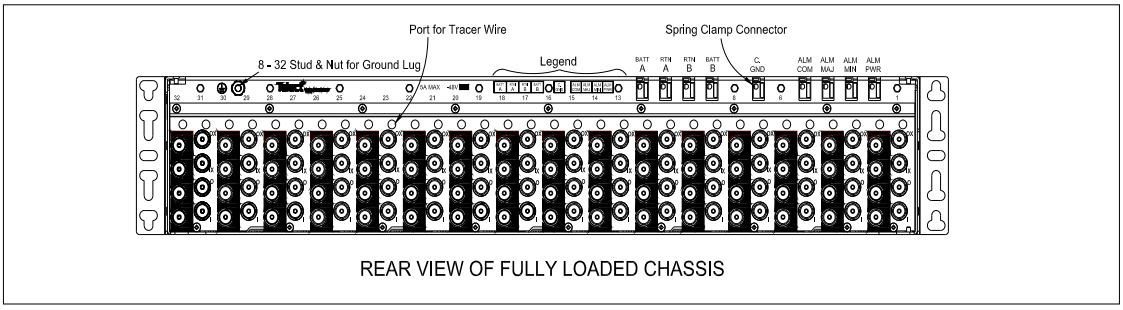

Figure 2 - Rear View of Fully Loaded Chassis

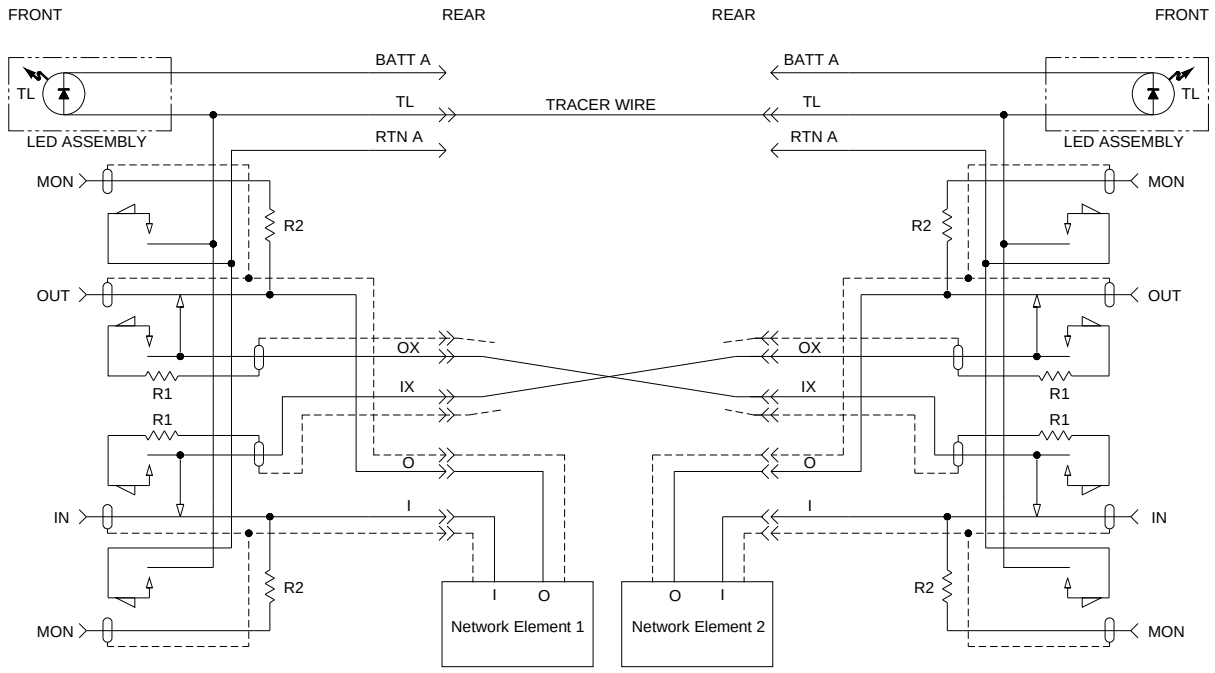

Figure 3 - Network Element Circuits

1.1.1 BCS 4R Fully-Loaded Chassis

Telect now provides fully-loaded 19” and 23” DSX-3 panels. These products come pre-loaded with either 6-port or 4-port modules. See the following table for part numbers.

Table 1 - Fully-loaded 19” and 23” DSX-3 panels

Chassis	Module	Part Number
19”, 24-position	6-port	010-8324-0410
19”, 24-position	4-port	010-8324-0401
23”, 32-position	6-port	010-8332-0410
23”, 32-position	4-port	010-8332-0401

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1.1.2 BCS 4R DSX-3 Module (Models 010-8301-0401 & 010-8302-0401)

Telect's BCS 4R DSX-3 Module is a 4-port passive card module for populating the BCS 4R Chassis.

Model 010-8301-0401 fits every odd-numbered shelf position (Positions 1 through 31) and Model 010-8302-0401 fits every even position (Positions 2 through 32). (BCS 4R DSX-3 Module kit [Model 999-8300-0401] contains one odd and one even module.) The BNC connections on the rear of the even versus the odd modules are slightly offset to accommodate 32, side-by-side modules in each chassis.

BNC circuit assignments are as follows:

- Input (**I**) to and Output (**O**) from the network element, and
- Cross-connect input (**XI**) and output (**XO**) — from/to another DSX-3 module. Cross-connections between DSX-3 Modules should be 27 ft. or less.

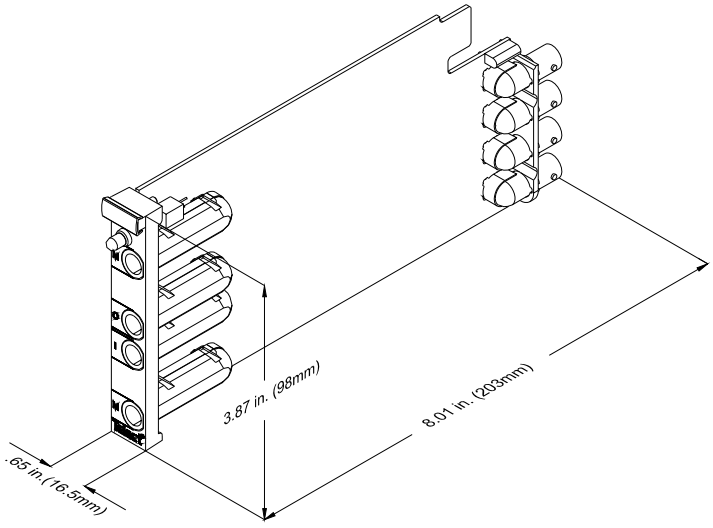

Figure 4 - Cross-connect Inputs

The four ports on the front of the module are Mini-WECO connectors for temporary Input (**I**) and Output (**O**) patch cords (734A or 735A cables) from/to a standby DSX-3 circuit, and for temporary Monitor (**M**) patch cords:

- The I and O patch connections are intrusive, highly reliable, make-and-break connections that break (disconnect) the cross-connect circuits at the same time making (connecting) the standby circuit. Patch cord connections between DSX-3 modules should be 20 ft. or less.
- The **M** connections are non-intrusive connections that allow for testing, diagnosis, and trouble-shooting without disconnecting either normal or standby service.

The front of the module contains a red tracer LED fed by power supplied from a GMT power shelf. A tracer wire is inserted through the rear of the BCS 4R Chassis; the tracer lamp is lit by grounding the tracer wire at the trace controller. Tracer lamps aid in diagnosing problems by visually mapping out assigned network element cross connections.

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1.1.3 BCS 4R Chassis (Model 010-0000-8301 and 010-0000-8302)

The 23-in. and 19-in. BCS 4R Chassis are shelves containing 32 and 24 positions, respectively, for BCS 4R DSX-3 modules.

Each chassis includes a power backplane to feed -48Vdc, tracer-lamp power to the DSX-3 modules. Each chassis comes with cable management ring assemblies that attach to the rear of the rack and flipout designation cards that attach to the mounting brackets on the front of the rack. (Designation cards are not shown in the following illustration.) All mounting hardware is included.

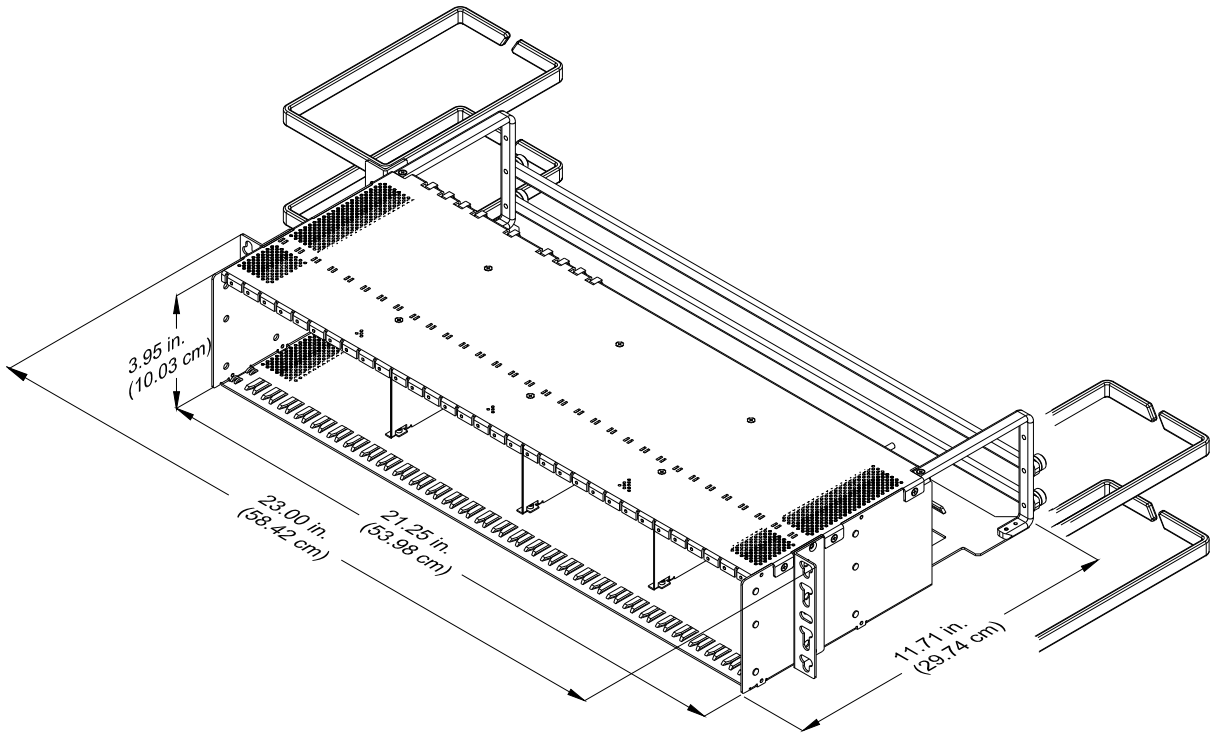

Figure 5 - Model 010-0000-8301

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1.1.4 Applications

Telect's BCS 4R System is ideal for central offices and other DSX-3 distributive activities including

- high-density central offices
- other DS3 network applications
- cutover / acceptance activities
- restoration of service activities
- routing maintenance activities

as well as normal DCS interconnects, or wherever reliable, low-cost DSX-3 connectivity is a must.

1.1.5 Cutover / Acceptance Activities

BCS 4R DSX-3 simplifies equipment installation and cutover by providing temporary digital line patch cord connections during new equipment installation. After the new equipment has been wired to the DSX, cross-connections are made to connect the new equipment in its final office configuration. Removing the wiring from the DSX to the old equipment and taking down the patch cords completes the cutover.

1.1.6 Restoration of Service Activities

Malfunctioning equipment is readily identified at the BCS 4R DSX-3 by equipment sectionalization (circuit split-test in both directions) and by patching substitute equipment for verification. Digital line patch cords at the DSX can immediately restore any out-of-service facility, whether caused by a cable cut, malfunctioning equipment, etc. Rather than using jacks located at the individual units, manual restoration patching can be done at a centralized location — at the DSX. When the equipment or cable is repaired or routing for preventive maintenance is accomplished, the facility can be returned to its original configuration by simply removing the patch cords.

1.1.7 Routine Maintenance Activities

Periodic testing of facility parameters assures maintenance of adequate service levels. By terminating all digital office equipment at one central point — at the BCS 4R DSX-3 — overall testing can be performed from the central location. Periodic testing at DSX test jacks, connected directly to digital equipment inputs and outputs, identifies marginal equipment.

Circuit order work is another important routine maintenance activity. Major changes in traffic patterns may leave a surplus of capacity at a vacated area and a shortage at another. Traffic pattern changes are rapidly accomplished by reconfiguring cross-connect jumpers at the DSX. The ability to make these changes at the DSX makes major rewiring unnecessary and results in a reduction of skilled manpower and time requirements.

1.1.8 Features / Capabilities / Capacities / Benefits

Telect's BCS 4R offers the following:

- total front access for patching and monitoring
- easy access to cross-connections
- 75Ω impedance
- support for all coaxial interface digital signal rates (DS3, STS-1, E-3, STM-1, and STS-3)
- network I/O and Cross-Connect BNCs on the rear; patch and high-impedance Monitor Mini-WECO on the front
- bi-directional monitoring
- tracer lamps for identifying cross-connections during troubleshooting
- fully configured panels that streamline ordering and accelerate deployment
- high density: 24 terminations in a 19" chassis; 32 terminations in a 23" chassis
- space savings: Each panel just 4" in height
- essential functionality: 6-port mini-WECO modules enable bi-directional monitoring, patch, test and cross-connect capabilities; 4-port modules also available
- simplified design: LEDs on front only; cable equipment to panel as you add modules
- NEBS Certified and backed by Telect's DSX lifetime warranty

1.1.9 Compliance

- NEBs Level 3
- $_{c}UL_{us}$
- FCC
- CE

1.2 DSX-3 Specifications

Electrical Interface:	Specifications:
Insertion Loss	≤ 1.00 dB at DS3/E3 signal rates
Monitor Level	21 dB ± 1.5 dB below signal level
Return Loss	≤ -26 dB at DS3/E3, STS-1 signal rates ≤ -26 dB at E3 signal rate of 17.184 Mhz ≤ -15 dB at STS-3/STM-1 signal rates
Contact Resistance	< 0.01Ω
Characteristic Impedance	75Ω
Tracer Lamp LED	Draws 9mA at -48Vdc

Mechanical Interface:	Specifications:
Jack Insertion Force	10 lbs maximum, 4.1 lbs. minimum
Jack Withdrawal Force	7 lbs. maximum, 3.8 lbs. minimum
Jack Life	Minimum 10,000 insertion/withdrawal cycles

Environment:	Specifications:
Thermal Ambient Limits	-55°C to 85°C, non-operating -5°C to +55°C, operating
Thermal Shock	per MIL-STD-202, methods 107D
Humidity	0% to 95%, noncondensing, operating and non-operating

Chapter 2: Installation

2.1 Installation Considerations

CAUTION

CAUTION! Only qualified technicians may install and maintain his product.
These instructions presume you have verified that the Telect equipment being installed is compatible with the rest of the system, including power, ground, circuit protection, signal characteristics, equipment from other vendors, and local codes or ordinances.

ALERT

Use this equipment in a RESTRICTED ACCESS LOCATION ONLY.

2.1.1 Location and Space

The BCS 4R chassis mount in standard 19 in. or 23 in. WECO-spaced or EIA-spaced racks. Allow for four inches of vertical space per chassis.

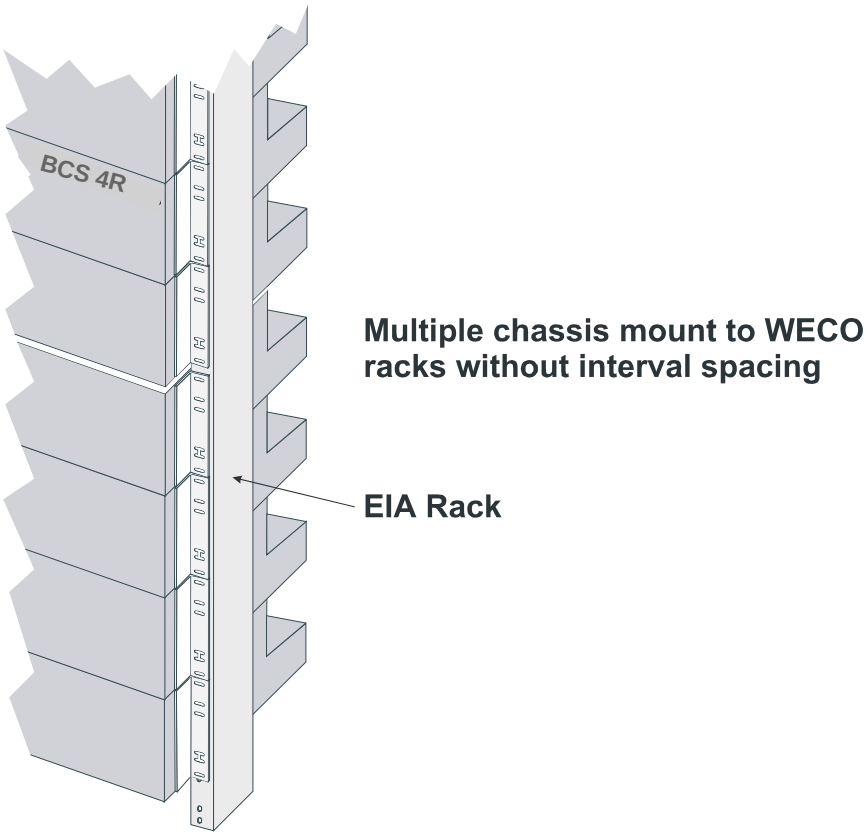

Figure 6 - Rack

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2.1.2 Computer Floor Issues

The weight of a fully populated BCS 4R *bay* may exceed 500 lbs. Each configuration will vary in weight depending on number and type of cards and cables used. Adding repeaters will increase weight. If bay weight exceeds the support capacity of your floor, computer floor supports may be required.

2.1.3 Required Tools and Equipment

- BNC crimpers for constructing BNC connector ends. Die sets required, depending on cable.
- BNC insertion tool, Telect PN 097197.

2.2 Inspection

Compare the contents of the shipping container with the packing list. Call Telect or your distributor if you are missing anything.

Telect is not liable for shipping damage.

If the shipping container is damaged, keep it for the carrier's inspection. Notify the carrier and call Telect's Customer Service Department: 1-800-551-4567 or 1-509-926-6000

Keep the container until you have checked equipment operation. If you experience any kind of problem, call Telect's Customer Service Department. Use the original, undamaged container if you are instructed to return the BCS 4R component to Telect.

2.3 Installation

1. Mount the BCS 4R chassis, along with designation cards, to a rack, using the four supplied mounting screws (two per side). Torque to 35 in.-lbs (4.29 N•m.).

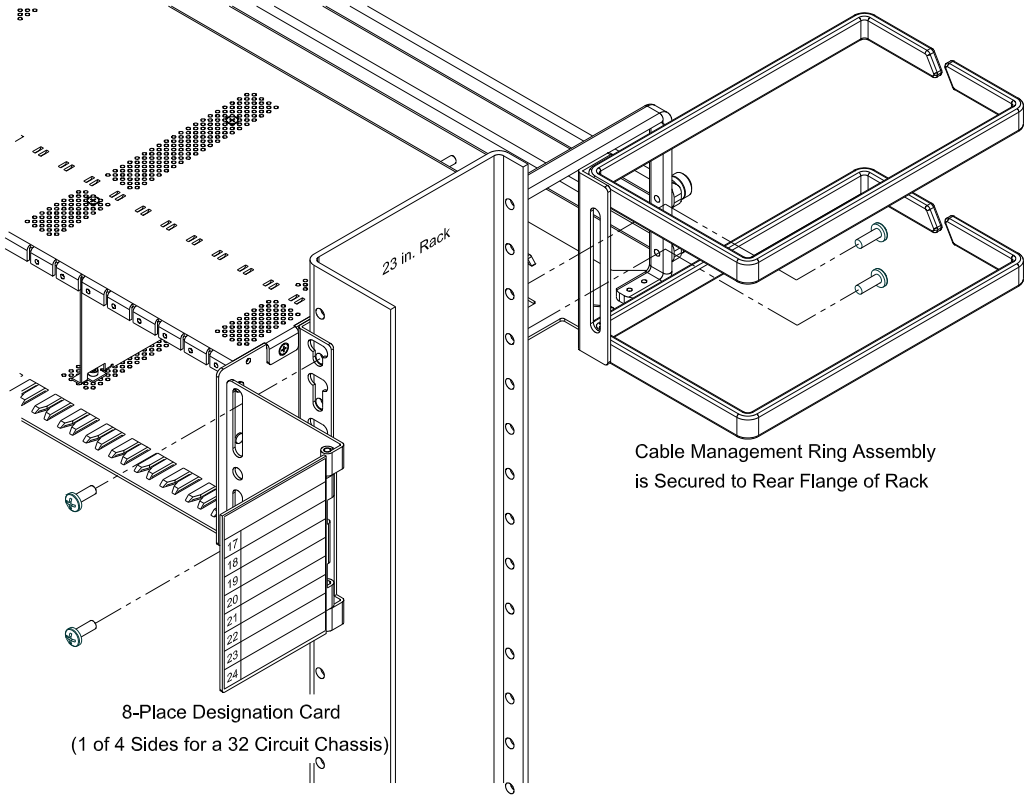

Figure 7 - Mounting Chassis to Rack

2. Install cable management rings on the rear rack flange using the hardware provided.
3. Repeat Steps 1 and 2 to install all BCS 4R chassis before installing power and I/O cables to any BCS 4R chassis in the rack.
4. For BCS 4R chassis that require power, route power from the power distribution panel to connectors on the rear of BCS 4R chassis.

   Use wire in the 10-22 AWG range. Strip away about $^{3}/_{8}$ in. (~10 mm) of insulation and then press in on the tab at the top of the connector to open the connector's jaws. Insert the wire below the tab and then release the tab to cinch the wire.

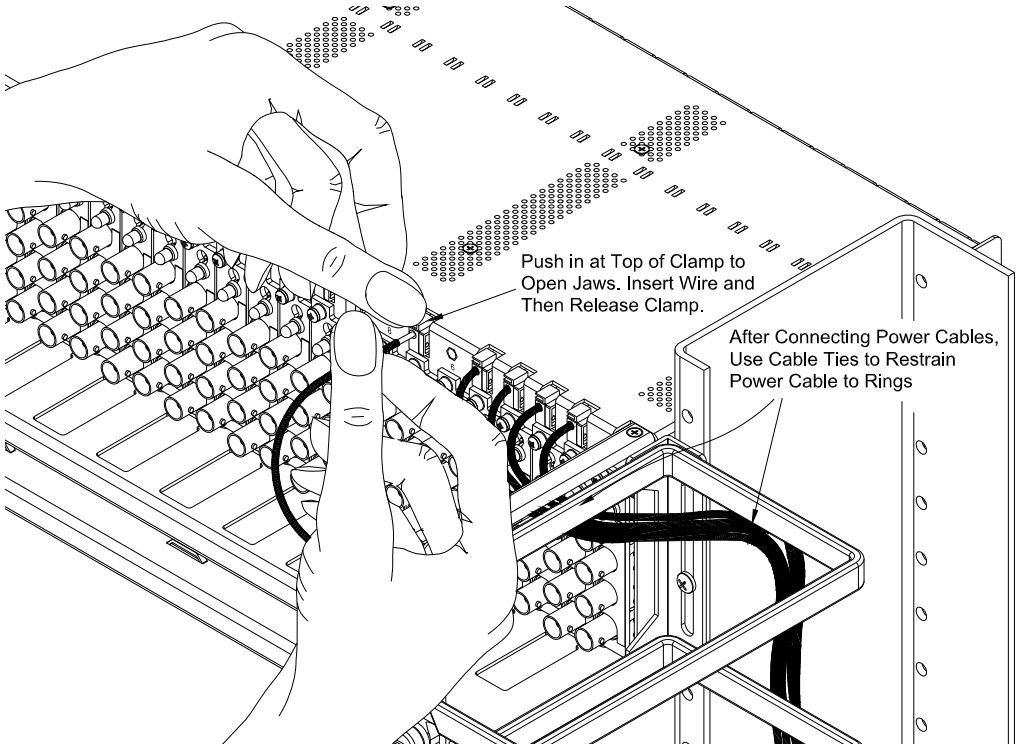
Push in at Top of Clamp to
Open Jaws. Insert Wire and
Then Release Clamp.
After Connecting Power Cables,
Use Cable Ties to Restrain
Power Cable to Rings

Figure 8 - Routing Power

5. Ground the chassis lug to the rack using #6- to #14-AWG stranded wire and a single-hole compression ring lug for a #8 stud.

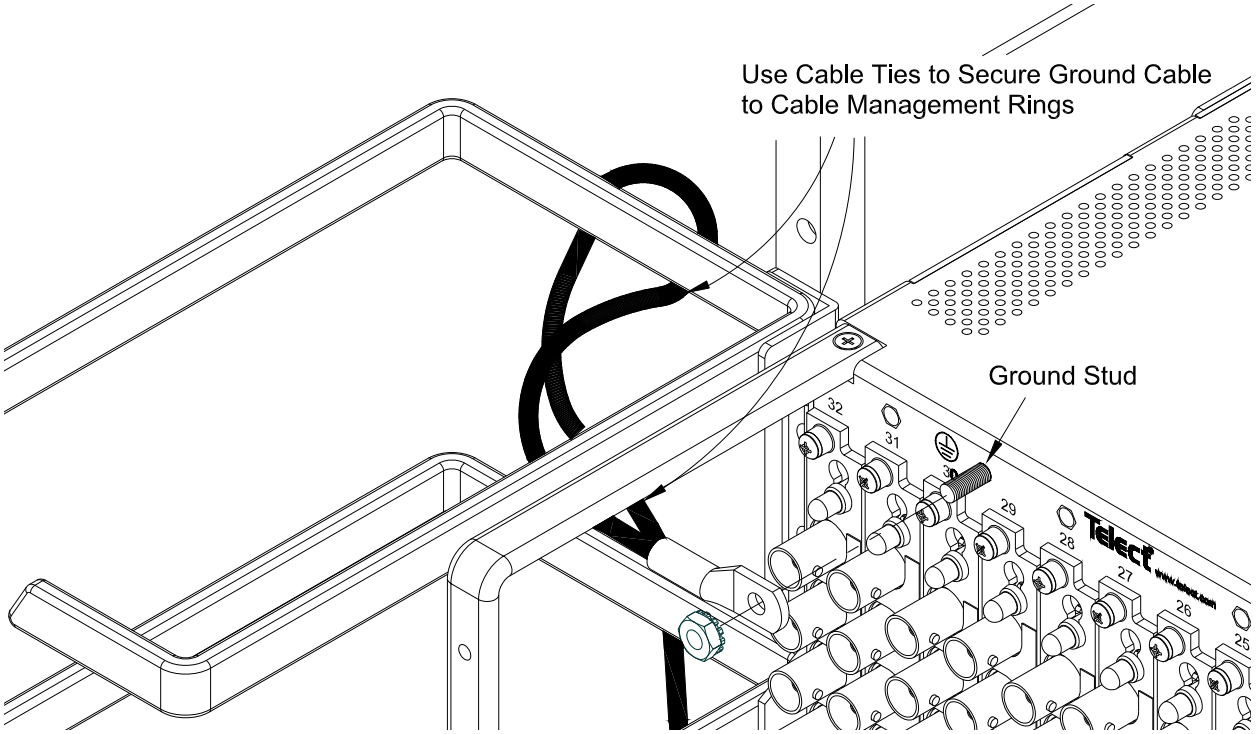

Figure 9 - Grounding the Chassis

6. Connect I/O cables to the rear of the chassis, as shown in the following illustration. In general,
   - For network I/O cables originating overhead, start with the lowest BCS 4R chassis in the rack and work up.
   - For network I/O cables originating from below, start with the highest chassis in the rack and work down.
   - NE I/O cables connect to the lower I/O connectors on the chassis. Use a BNC insertion tool.

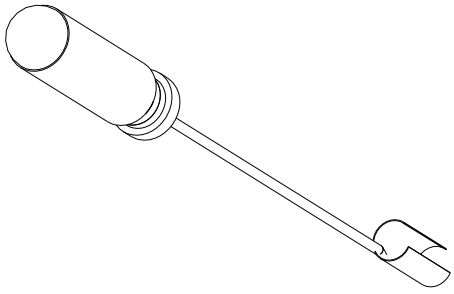

Figure 10 - BNC Insertion Tool

7. Use cable ties liberally along the lower tie-down bar and tie-down lances (loops) at the rear of the chassis.
8. Insert cross-connecting cables to upper two connectors, labeled IX and OX on DSX cards.
9. If applicable, connect tracer wire to the port above the tracer LED, as shown.
10. Use cable ties along the upper tie-down bar to restrain the X-connect cables.

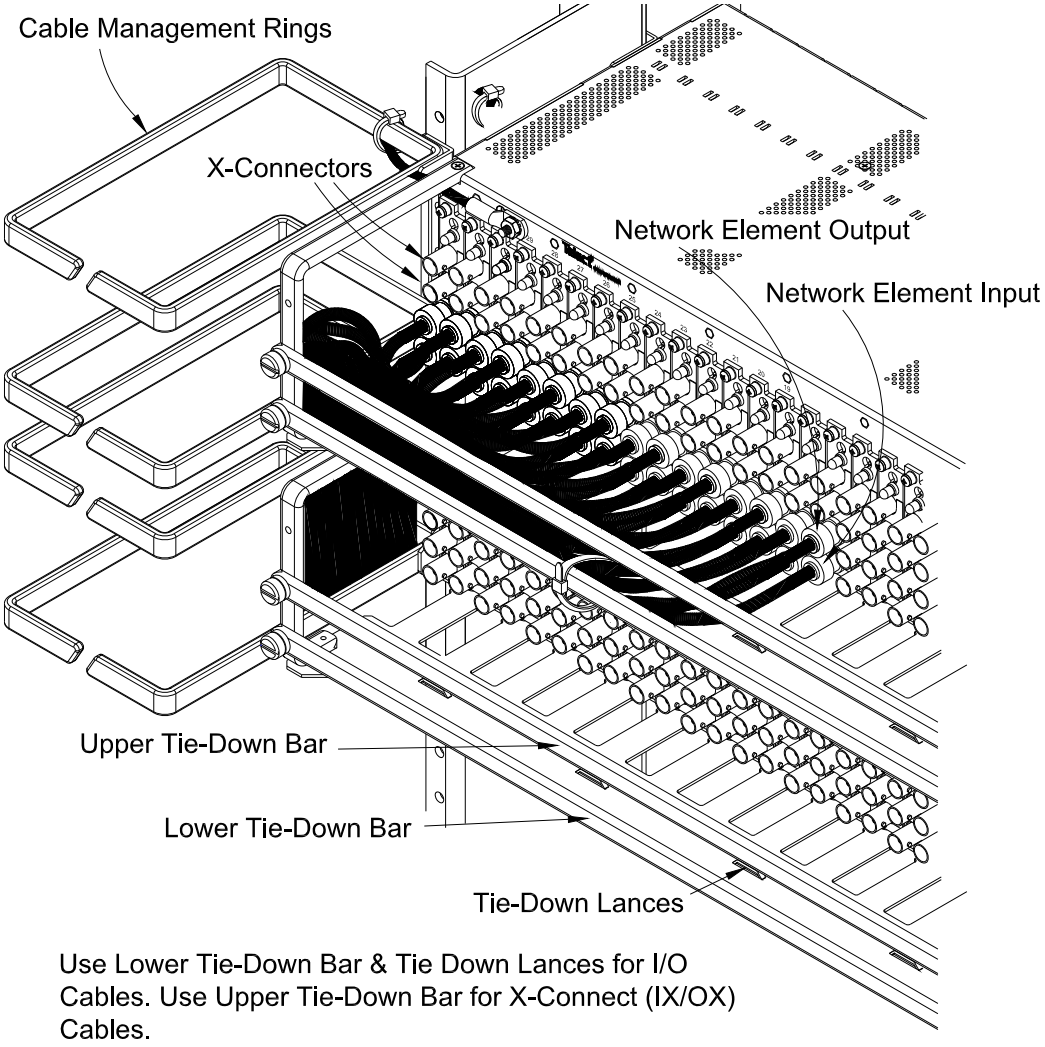
Cable Management Rings
X-Connectors
Network Element Output
Network Element Input
Upper Tie-Down Bar
Lower Tie-Down Bar
Tie-Down Lances
Use Lower Tie-Down Bar & Tie Down Lances for I/O Cables. Use Upper Tie-Down Bar for X-Connect (IX/OX) Cables.

Figure 11 - Connections

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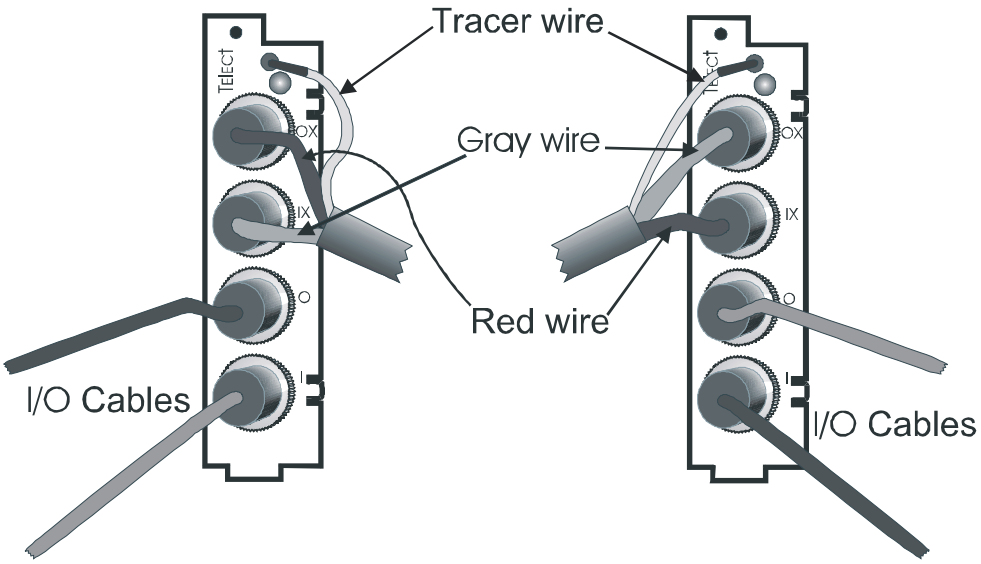

Figure 12 - Rear Cross-Connect Cables with Tracer Wire

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Chapter 3: Electrical Operation

3.1 Power

The BCS 4R equipment is passive with the exception of the repeater and Vector OTM card modules. The DSX chassis accept -48V office battery power to light the tracer lamps (TL) LED on the front of DSX and repeater cards and LEDs on the rear of the chassis.

Power connects to the Power/Alarm Terminal Strip on the back of each DSX chassis. The strip terminates a bus on the chassis backplane; all DSX card connectors on the backplane tap into the signal lines of this bus. Power for the rear TLs passes from the bus on the backplane, through the DSX card, to a small PCB also on the backplane.

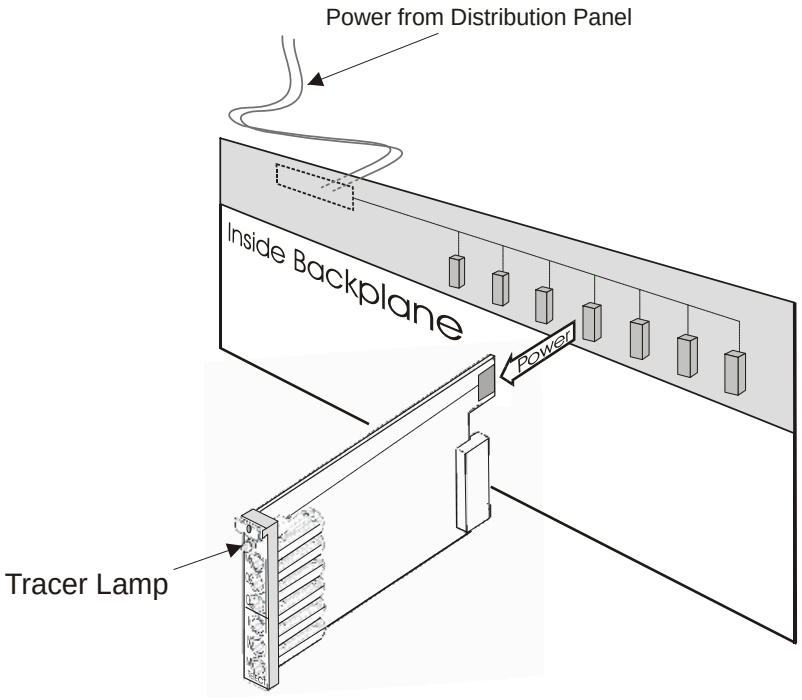

Figure 13 - Power from Distribution Panel to Front Tracer Lamp

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3.1.1 Tracer Lamps (TL)

The TL lights up when a plug is inserted into one of the monitor jacks on the front of a DSX card. Also, with the monitor plug in place, TLs of cross-connected cards will flash for 30 seconds, then light steadily.

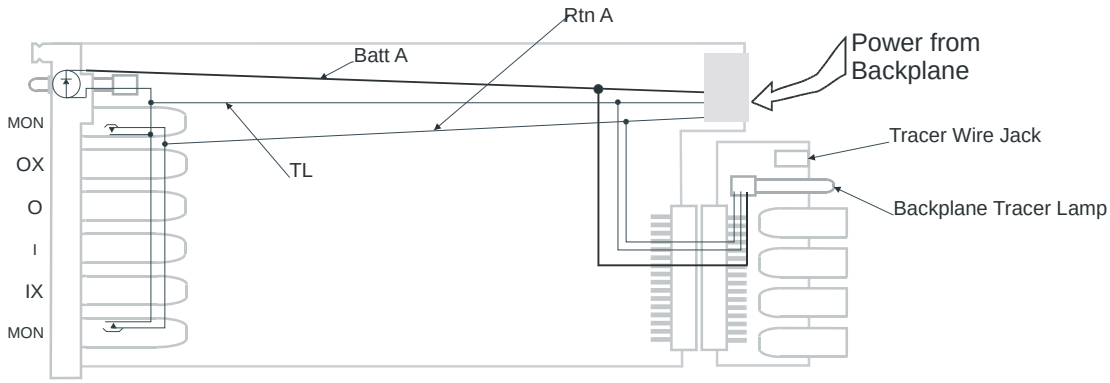

Figure 14 - Tracer Lamp Operation

3.1.2 Monitor Ports

All DSX cards have at least one monitor port on the front side, labeled “M” or “MON”. Test equipment may be applied without interrupting service. The three-port card has a monitor for the OUT signal only.

3.2 DSX Cross-Connections

Do not make rear cross-connections using cables longer than 27 ft, unless using a repeater card. Do not make front patch connections longer than 20 feet.

3.2.1 Backplane Cross-Connections

To cross-connect two network elements, use approved coax cable and connect the OX (X-OUT) port from the card for network element 1 (NE-1) to the IX (X-IN) for network element 2 (NE-2), AND connect the OX port for NE-2 to the IX port from NE-1. See the diagrams below.

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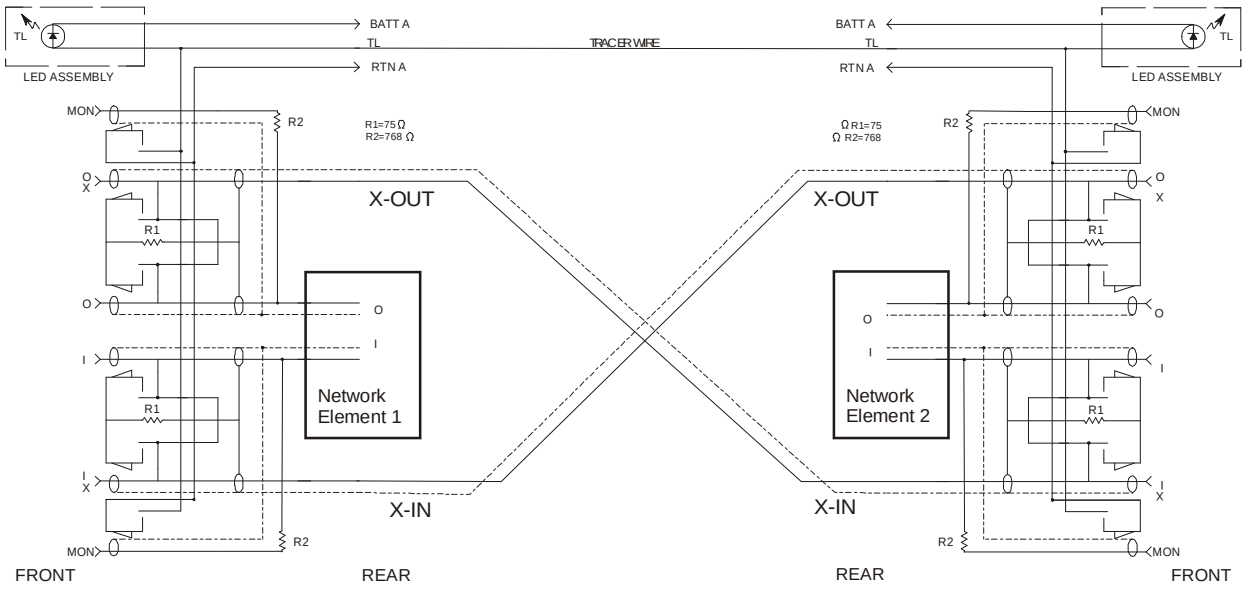

Figure 15 - Schematic Drawing of Cross-Connection

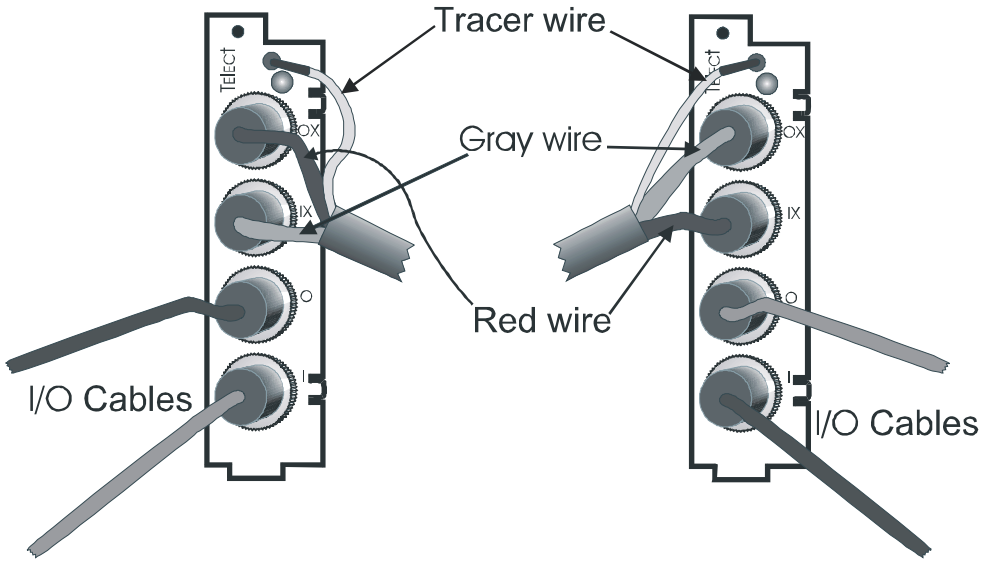

Figure 16 - Rear Cross-Connect Cables with Tracer Wire

3.2.2 DSX Card Front Patch

Install front patches to temporarily re-route signals. *Patches with jacks labeled O,OX, I, IX are intrusive and interrupt service.* Use 734A or 735A cable. Patch only to cards less than 20 feet away. Remove temporary patches in accordance with office procedures after permanent backplane cross-connections have been made.

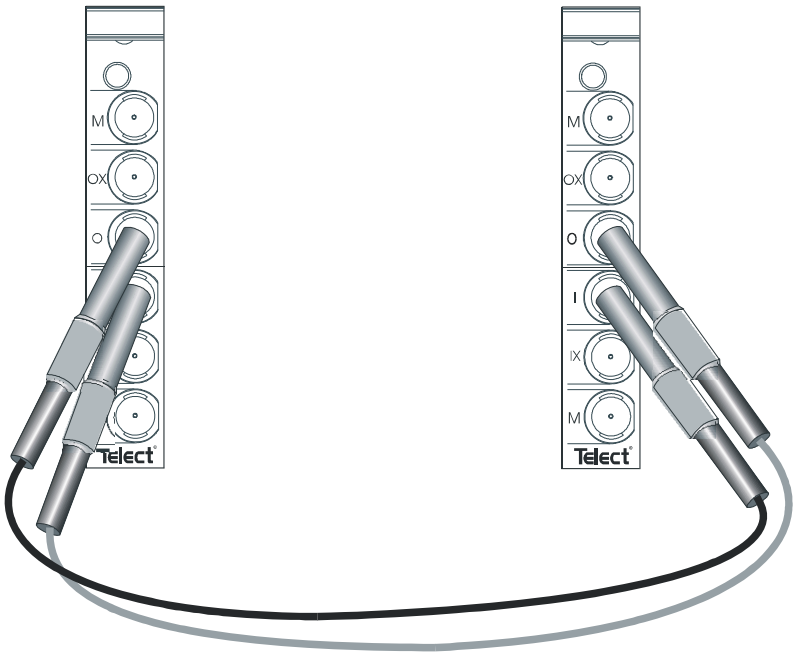

Figure 17 - Temporary Front Cross-Connect Using Patch Cables & DSX Cards

Chapter 4: Service

4.1 Owner Maintenance

Telect's BCS 4R components do not need preventive maintenance. The only service you can perform is to replace these assemblies if they fail:

- DSX Card Module
- Repeater Card Module
- DNI Card Module
- Chassis
- Tracer lamp LEDs, on card and on backplane

4.2 Troubleshooting Cross-Connected Signals

Check for correct and firm cable connections at the termination and cross-connect points on every card.

4.3 Replacing the Tracer Lamp LED

Pull the LED assembly and plastic holder straight out.

If LED polarization is not correct, the replacement will not work. Orient the new LED in the plastic holder the same as the original. The shape of the LED holder slot in the DSX module is keyed for proper LED insertion.

4.4 Service

4.4.1 In-Warranty Service

Contact your Telect equipment distributor, or call a Telect Customer Service Representative:

1-800-551-4567
1-509-926-6000

Telect will repair or replace defective products within the limits of the warranty. See "Repacking for Shipment" in this section.

Call a Customer Service Representative for a Return Material Authorization (RMA) before returning any equipment.

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4.4.2 Out-Of-Warranty Service

The procedure for out-of-warranty service is the same as for in-warranty service, except that Telect charges a processing fee, and you must submit a Purchase Order along with a Return Material Authorization (RMA) before returning equipment. Call a Customer Service Representative for help getting these forms.

The processing fee guarantees a repair estimate and is credited against actual material and labor costs.

4.5 Repacking For Shipment

Telect is not liable for shipping damage.

1. Tag the equipment showing owner's name, address, and telephone number, together with a detailed description of the problem.
2. Use the original shipping container if possible. If you do not have it, package the equipment in a way to prevent shipping damage. Include the RMA inside the container.
3. Insure the package.